NOTES ON THE HABITS OF SOME NORTH AMERICAN CURCULIONIDAE (COLEOPTERA)[1]

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The following notes record observations made on certain weevils occurring in the United States.

Attelabus bipustulatus Fabricius. A host of this species not previously reported is ironwood leaves as observed in eastern Maryland and northern Alabama. Blatchley and Leng (1916) make the statement that the larvae "fed on the dry substance of their nest, . . . " A short experiment was carried out to determine the conditions of relative humidity (R.H.) optimum for development. This was done by collecting a number of leaf rolls from *Quercus alba L.* and *Q. falcata* Michx. and holding them under the desired conditions of R. H. produced by using a particular dilution of concentrated sulphuric acid in a closed container. The rolls were collected on May 1 and examined on June 10. Of 23 leaf rolls held at 100% R. H., 10 contained adults and 2 rolls pupae; 3 contained living larvae. Of 19 leaf rolls held at 90% R. H., 10 contained living larvae but no pupae or adults. Twelve leaf rolls were held at 80% R. H. of which 5 contained living larvae but no pupae or adults; the larvae were smaller than those held at 90% R. H. Apparently the leaf roll must be in a fairly humid environment for the larva to develop rapidly. It is my impression that the leaf roll falls to the ground shortly after the female has finished preparing it; the ground surface would tend to be more humid than the air 5 to 10 feet above the ground. Preliminary investigation did not show a noticeable correlation between weight of leaf roll and sex of emerging adult; rolls producing males weighed about 10.3 to 16.8 mg. while those producing females weighed about 11.9 to 26.1 mg., the last being an unusually large roll.

Apion curticorne Fall. Adults of this species occur at Seneca, Maryland on the composite *Actinomerus alternifolia* DC., a plant which is easily recognized by its winged stem. During August a sizeable collection of flower heads was made; on October 12 a few teneral individuals of *curticorne* were found in the cage containing the dried up flower heads and one individual was dissected from a seed.

Apion cavifrons LeConte. Adults of this species were abundant on flowering and fruiting vines of *Vicia gigantea* Hooker, in Strawberry Canyon, Berkeley, California from February through May (when observations ceased), but larvae were not found.

Apion dolosum Fall. Kissinger (1959) associated adults of this species with *Robinia neomexicana* Gray. Immature pods of this plant were collected near the Barfoot fire lookout, Coronado National Forest, Cochise Co., Arizona (near the Southwestern Research Station). Twelve pods of 60 examined were infested with larvae. The larvae mine the upper or lower part of the pod and invade the developing seed, up to 5 larvae per pod were found.

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Apion nigrum Herbst. The following observations on this species were carried out near Huntsville, Alabama. The immature stages of this species are not easy to study because the pods they occupy are borne usually high in the black locust tree, *Robinia pseudacacia* L. On May 8 the pods were about 0.75 inches long and the flowers were beginning to drop; at this time two eggs and one second (?) instar larva were found. On May 17, 42 pods were examined of which two contained larvae, one larva may have been a 4th instar. On May 21, 900 pods were examined of which seven contained living individual larvae, seven had mummified larvae, and 10 contained head capsules indicating death occurred apparently during an early instar. On June 4, 405 pods were checked of which one contained a dead, late instar larva. By June 21 teneral adults were found on the foliage of the host plant. One pod with a fairly large larva yielded a male adult *nigrum* when held under very humid conditions in the laboratory. Preliminary observations indicate that larvae are not randomly distributed in the pod but occur toward the apex in the kind of "tail" on the pod that is produced when no ovules develop in that region. Practically all the living larvae I found were in the apical part of the pod. Most of the dead larvae were found higher in the pod. Occasionally quite a large space will occur between developing seeds toward the middle of the pod, and some larvae were found here but generally these were dead. Apparently the larvae mine the developing pod and do not attack the developing seeds. When the female excavates a small cavity to receive the egg an adjacent ovule may be killed. The egg cavity is sealed with a small plug of excrement. Usually one larva is found in a pod.

The larval habits of *nigrum* appear to differ somewhat from those of *dolosum* Fall, a closely related species occurring in the mountains of Southwestern United States, both species developing in *Robinia* pods. As noted above *dolosum* may have up to five larvae per pod and these attack the developing seeds; *nigrum* usually has one larva per pod and apparently does not attack the developing seed.

There is at present an unsolved relationship between *A. nigrum, A. porcatum* Boheman and *Robinia pseudacacia* L. Adults of both species of *Apion* may occur together on the foliage of black locust, as was noticed at Huntsville, Alabama and Baltimore, Maryland and also recorded by Blatchley and Leng (1916). The following numbers of specimens were collected on black locust foliage in the study area at Huntsville, Alabama: May 8, only *nigrum,* no *porcatum;* May 17, 50 *nigrum* and 1 *porcatum;* May 21, about as many *porcatum* as *nigrum*. June 4, about 50 *nigrum* and 1 *porcatum;* June 21, about 200 *nigrum* and no *porcatum*. Some live females from the May 21 sample were dissected; *nigrum* females had little fat body and well developed ovaries with large eggs, while *porcatum* females had a great deal of fat body and the ovaries were poorly developed. I suspect that *porcatum* feeds on black locust until its usual host plant can support it, but the actual larval host at present is not known.

Apion patruele Smith. In my revision of *Trichapion* (Kissinger, 1959) it was noted that adults of this species were found on foliage of the legume, *Apios americana* Medic. Near Fitchburg, Massachusetts (in the vicinity of Redemption Rock) larvae and pupae of *patruele* were found on August 27 within developing flower buds of *Apios americana* Medic, the only species of *Apios* common in eastern United States.

Apion proclive LeConte. Kissinger (1959) associated this species with plants of *Lupinus* sp. At San Francisco, California larvae were found mining fairly large (1-2 inches long) seed pods of *Lupinus* sp. Late instars attack the seed, and pupation occurs in the pod at the site formerly occupied by the seed.

Apion puritanum Fall. In the vicinity of Clinton, Massachusetts adults of this species occur on blooms of *Viburnum dentatum* L. during June. The fruit of this plant is somewhat flattened, and egg punctures can be found on the edge of the fruit. Apparently the main barrier to the success of the larva is the developing seed coat. Following successful penetration of the seed coat and entrance into the developing seed, the larva develops rapidly. Mature larvae were found inside the seed by July 30 and (under laboratory conditions) adults were noticed by August 15.

Apion simile Kirby. The following observations were made near Clinton, Massachusetts on the host plant *Betula papyrifera* Marsh. On June 11 eggs and very small larvae (probably first instars) were noticed in fruiting aments. By July 3 pupae were noticed and adults were seen (under laboratory conditions) by the middle of July. The egg is most often laid near the middle of the ament. The site of egg deposition can be detected because one or two bracts turn brown due to injury incurred; these brown spots can be seen fairly easily. The larva then burrows through the fleshy bracts and small developing seeds in a direction parallel to the axis of the ament. Apparently it always burrows toward the base of the ament. The infested ament, although extensively mined, shows no outward indication of infestation except for a few brown bracts at the site of oviposition. The larva apparently feeds mainly on the growing bracts, which at this time constitute the largest part of the ament. The developing seeds become sizable after the larva ceases to feed. Pupation takes place in the ament. Part of the burrow is cleared of frass to form a chamber, either end of which is plugged with a dense mass of frass and excrement. An unidentified lepidopterous larva also mines the aments and usually starts feeding extensively about the time the *Apion* is ready to pupate. Possibly the dense mass of frass referred to above protects the weevil pupa from the caterpillar which may eat unprotected pupae. Dr. W. H. Anderson discovered the larvae of *simile* in birch aments some time ago near Washington, D. C. (unpublished).

Apion lanuginosum Walsh (1867) (not Gerstaecker, 1854) was described from material taken from galls of *Cecidomya* sp. on *"Salix strobiloides."* Smith (1884) renamed the species *Apion walshii*. Kissinger (1959) subsequently showed that *A. walshii* is a synonym of *A. simile* Kirby (1811). At the present time no species of *Apion* is known to develop in galls on willow. Since Walsh's type is presumably lost we are left with Smith's interpretation of the species. Smith could have misinterpreted Walsh's species which really does develop in galls on willow, or Smith may have correctly interpreted the species, and adult *simile* occurred in the gall of *Cecidomya* sp. perhaps as an over-winter shelter. Wahlgren (1951) cites *A. simile* as a gall maker on *"Betula verrucosa"* but the second alternative given above may apply here also.

Brachystylus acutus (Say). The adults of this species have been known to occur on the foliage of persimmon trees for some time (Blatchley and Leng, 1916). Near Huntsville, Alabama larvae and pupae were found 3 to 8 inches below the surface of the ground in the vicinity of roots of persimmon. An adult was subsequently reared from a pupa in cell with fourth instar larval skin.

Myrmex dichrous LeConte. Blatchley and Leng (1916) quote Schwarz's note that the species is rare and occurs on dead palmetto leaves. Near Lake Placid, Highland Co., Florida in the vicinity of Parker Island more than 50 individuals were found in June by beating dried palmetto fronds. I suspect that the weevils were seeking refuge in the fronds rather than ovipositing.

Pseudobaris nigrina (Say). Adults, pupae and larvae of this species were found in the stolons of a mint, *Lycopus virginicus* L., near Huntsville, Alabama on August 17.

Buchananius striatus (LeConte). One adult was found near Huntsville, Alabama by beating small limbs of a dead, fallen black locust, on May 8. This particular area is about one-half mile from the site to be mentioned below for *B. sulcatus* (LeConte) and tends to be drier as it is on the top of a low hill.

Buchananius sulcatus (LeConte). Two adults of this species were found in a small, heavily wooded spot near Huntsville, Alabama at the base of the northern slope of the small hill. This particular site was quite humid and was shaded by very large hickory and white oak trees. The individuals were found by beating small hickory limbs either on or close to the ground surface. One individual found on September 9 was teneral, indicating recent emergence.

Plocamus hispidulus LeConte. One adult was found near Huntsville, Alabama in association with an individual of *Buchananius striatus* (LeConte) as mentioned above.

Cylindrocopturus quercus (Say). Adults and larvae of this species occurred in the smaller, outer branches of *Ambrosia artemisiifolia* L. near Huntsville, Alabama. *A. artemisiifolia* in this location is attacked by at least four weevils. *Baris* sp. larvae mine the cambium of the root stock; *Rhodobaenus tredecimpunctatus* (Illiger) burrows in the lower stem and upper part of the root; *Lixus sylvius* Boheman burrows the upper stem; and *Cylindrocopturus quercus* burrows the branches.

Acalles sordidus LeConte. Adults of this species were found near Huntsville, Alabama at the spot mentioned above under *Buchananius sulcatus* by shaking small, fallen limbs of hickory over a sheet.

Acalles ?inflatus Blatchley. Adults of this species were found at the locality mentioned above under *Buchananius sulcatus* under fallen limbs.

Canistes schusteri Casey. One adult was found beneath a hickory limb at locality mentioned above under *Buchananius sulcatus*. This represents a southern extension of the known range which is given by Blatchley and Leng (1916) as Kentucky, Missouri, and Ohio.

Apteromechus ferratus (Say). Larvae and pupae of this species were found near Huntsville, Alabama within the bark of a recently (year or so) fallen branch of sassafrass; adults were reared. The larvae appeared to mine mostly the bark of the branch without going deeply into the wood. Pupation took place in a cell in the bark.

Cryptorhynchus fallax LeConte. At the same locality mentioned above under *Buchananius sulcatus* larvae of this species were found within fallen branches of hickory; adults were reared. The whitish wood seemed quite old and soft; no termites were present and very few cerambycid larvae or pupae were noticed; the wood was not especially moldy.

LITERATURE CITED

BLATCHLEY, W. S. and C. W. LENG
1916. Rhynchophora or weevils of northeastern America. Nature Pub. Co., Indianapolis. 682. pp.

GERSTAECKER, C. E. A.
1854. Beschreibung neuer Arten der Gattung *Apion* Herbst. Stettiner Ent. Zeitung 15:234-261, 265-280.

KIRBY, W.
1811. Descriptions of seven new species of *Apion*. Trans. Linn. Soc. London 10:347-357.

KISSINGER, D. G.
1959. A revision of the *Apion* subgenus *Trichapion* Wagner in the New World (Coleoptera: Curculionidae). Proc. United States Nat. Mus. 110 (no. 3418):247-389.

SMITH, J. B.
1884. Synopsis of the Apioninae of the United States. Trans. Amer. Ent. Soc. 11:41-68, pl. 3.

WAHLGREN, E.
1951. Cecidiologiska anteckningar VI. Ent. Tidskr., 72:84-156.

WALSH, B. D.
1867. On the insects inhabiting galls of willow. Proc. Ent. Soc. Philadelphia 6:269 (1866).

LITERATURE NOTICE

COMPARATIVE MORPHOLOGY AND PHYLOGENY OF THE SUPERFAMILY CURCULIONIDEA OF JAPAN (COMPARATIVE MORPHOLOGY, PHYLOGENY AND SYSTEMATICS OF THE SUPERFAMILY CURCULIONOIDEA OF JAPAN I), by K. Morimoto. Journ. Faculty Agric. Kyushu Univ. 11:331-373, illus., 1962.—This is a refreshing change from the usual attempts at classification. Morimoto compares a single structure in all taxa before moving on to another structure. The method of comparative morphology, usually called the systemic method, has as its most desirable feature its simplicity; it limits the number of items which a taxonomist must evaluate at one time. Later, the whole animal can be considered. The usual method of comparative morphology of taxonomists is phylogenetic; all structures of one taxon are discussed before moving on to the next taxon. Taxonomists often use the systemic method in revisionary research but present findings in the phylogenetic method. The systemic method is most useful in studying higher taxa where great diversity in a morphological structure is often accentuated or masked by its neighbor. Someday there will be a phase of study called comparative morphology of beetles, just as there is today a comparative morphology of vertebrates. Let's hope it isn't too far in the future. We need more studies like Morimoto's to shorten that future.